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FLORIDA NATURAL RESOURCE USE VALUE DIGEST

PREPARED FOR THE NATIONAL OCEANIC AND

ATMOSPHERIC ADMINISTRATION FOR USE IN

RESEARCH ON RESOURCE USE VALUES IN THE

STATE OF FLORIDA

1999

CATEGORIES OF METHODOLOGIES FOR ESTIMATING USE VALUE OF NATURAL RESOURCES

1. CONTINGENT VALUATION METHOD(CVM)

In its simplest form, this method consists of asking questions to the user of a natural resource with respect to what they would either be willing to pay(WTP) or willing to sell the right to use a specific resource such as a day at the beach. This method may be open-ended where respondents(i.e., users) are asked to state their WTP. In other cases, respondents may be given a dollar figure for the natural resource use and asked to respond “yes” or “no”. In this way, the respondent has a dichotomous choice. There are many statistical techniques that can be used in conjunction with the dichotomous choice such as the Turnbull Distribution; logit; and probit methods to arrive at the use value of the natural resource. In the Digest that follows, the CVM will be used for the contingent valuation method in general. The user will have to either consult the annotated bibliography or the original citation to explore how the CVM was implemented and what particular statistical techniques were used.

2. TRAVEL COST METHOD(TCM)

This method employs the relationship between number of trips (or days) to the site of the natural resource and the travel cost to the site. It is hypothesized that the number of days will decline as travel cost increases for the individual and groups of people at a particular site. The travel cost is calculated in terms of expenses to get to the site; sometimes on-site costs and may include the opportunity cost of time (i.e., a user could be working rather than recreating). The Digest to follow will simplify by using two classes of the travel cost method (TCM): (1) The TCM using travel cost and/ or the opportunity cost of time and (2) RUM or the travel cost method (i.e., Random Utility Model) using not just one site, but all alternative sites the users could choose.

3. ALL OTHER METHODS (HPM; MPM)

This third classification is meant to include all other approaches other than the CVM and the TCM discussed above. This includes the hedonic pricing models (HPM) where actual market prices of good related to natural resources are used in conjunction with attributes of these goods. For example, housing prices may be used to reflect the WTP for air quality, a natural resource. Another method employs the marginal productivity of a natural resource to a user group to estimate the market value of that resource when it is not ordinarily priced in a market such as wetlands. This we shall call the MPM. There are numerous other methods that have been used to estimate use value of the resource. These are usually variations of the CVM discussed above.

COASTAL/MARINE

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| FISHERIES | 3 |
| (A) VALUES PER UNIT OF TIME | 3 |
| (B) INCREMENTAL VALUES PER FISH | 5 |
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| WETLANDS | 6 |
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FRESHWATER

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HOW TO USE THE USE VALUE DIGEST

If you would like to know the use value found in the literature for a particular natural resource and/or recreational activity using that natural resource, first refer to the above Index or categories of resources. For example, if a beach has been damaged by oil, you might want to know the range of beach use values found at various places in the State of Florida. Look under beaches. A fishery may be reduced in abundance because of a toxic spill. In this case, you may wish to look at the use values found for various groups or species of fish. When you have found the relevant category, we have listed the authors of the study first followed by, in most case, the WTP (willingness to pay) per day. This is the “use value” with which the use value digest is concerned. The WTP/day is followed by more specifics on what the number refers to such as location of the resource and kinds or species. For example, if you look under fisheries, you may be concerned with King Mackerel. This is found in the last column of the Digest along with whether the number refers to residents (R) of Florida or visitors from outside this area (V). Of special significance, please look at the numbers in parentheses. These are footnotes to the Digest that give qualifications to the entry. Be sure to reach these carefully. For example, a King Mackerel daily use value may only refer to that segment of the industry involved in charter boat fishing. Finally, be sure to consult the annotated bibliography cited in the Digest to get a fuller description of the study and where the original study may be found. If any problem arises in obtaining the original study, please call the NOAA Economist at 301-713-3000, ext. 138. It is hoped that this will be a useful tool for all persons interested in use value of a resource. Remember, the “use value” is the willingness of the user to pay for the use of a natural resource for which there is no organized market for exchange.

TABLE 1
A COMPREHENSIVE INVENTORY OF USE VALUE PER UNIT
OF TIME FOR RECREATIONAL/ OTHER NATURAL RESOURCES IN
FLORIDA COMPILED FROM THE ANNOTATIVE BIBLIOGRAPHY
IN 1998 DOLLARS

| <u>RESOURCE</u> <u>CLASS</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY</u> <u>(DOLLARS)</u> | <u>METHOD</u> | <u>SITE/KIND</u> | <u>USER</u> <u>R=RESIDENT</u> <u>V=VISITOR</u> |
|--|-------------------------------|------------------------------------|---------------|--------------------------------------|--|
| <u>COASTAL/</u> <u>MARINE</u> | | | | | |
| <u>FISHERIES</u> | | | | | |
| <u>(A) Values Per</u> <u>Unit of Time</u> | | | | | |
| | Arndorfer&Bockstael (1986) | \$269-\$982 | TCM | Gulf of Mexico/ King Mackerel (1) | R/V |
| | Leeworthy (1986) | \$68 | TCM | All Florida/ King Mackerel(2) | R/V |
| | Leeworthy (1997) | \$69 | TCM | Florida Keys/ All Species | R/V |
| | Platt (1989) | \$70 | TCM | Destin/Panama City/Grouper(1) | R/V |
| | Green (1989) | \$94 | TCM | All Florida/ Red Drum | R/V |
| | McConnel&Strand (1994) | \$107 | RUM | All Florida/R/ All Species | R/V |
| | Glasure (1987) | \$24 | TCM | All Florida/ All Species | R |
| | Green (1984) | \$84 | TCM | All Florida/ All Species | V |

TABLE 1 (CONT'D)

| <u>RESOURCE</u> <u>CLASS</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY</u> <u>(DOLLARS)</u> | <u>METHOD</u> | <u>SITE/KIND</u> | <u>USER</u> <u>R=RESIDENT</u> <u>V=VISITOR</u> |
|---------------------------------|----------------------|------------------------------------|---------------|--|--|
| COASTAL/ MARINE (Cont'd) | | | | | |
| <u>FISHERIES(Cont'd)</u> | | | | | |
| | Green (1984) | \$21 | CVM | All Florida/ All Species(3) | V |
| | Green (1984) | \$70 | CVM | All Florida/ All Species(4) | V |
| | Bell (1992) | \$ 4 | CVM | All Florida/ All Species | V |
| | Bell&Leeworthy(1981) | \$69 | CVM | All Florida/ All Species | V |
| | Bell&Leeworthy(1981) | \$52 | CVM | All Florida/ All Species | R |
| | Green et al (1992) | \$810 | TCM | GulfMexico/R/ Reef Fish | V |
| | Green et al (1997) | \$1.71 | RUM | Tampa Bay/ All Species(5) | R/V |
| | Green et al (1997) | \$3.73 | RUM | Tampa Bay/ All Species (6) | R/V |
| | Milon&Apogee(1996) | \$1.76 | TCM | Indian River Lagoon/Redfish/ (7) | R |
| | Milon&Apogee(1996) | \$1.85 | TCM | Ind. R. Lagoon/ Snook /(7) | R |
| | Milon&Apogee(1996) | \$2.37 | TCM | Ind. R. Lagoon/ Trout /(7) | R |

TABLE 1 (CONT'D)

| <u>RESOURCE</u> <u>CLASS</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY</u> <u>(DOLLARS)</u> | <u>METHOD</u> | <u>SITE/KIND</u> <u>R=RESIDENT</u> <u>V=VISITOR</u> | <u>USER</u> |
|---|-------------------------------|------------------------------------|---------------|---|-------------|
| COASTAL/ MARINE (Cont'd) | | | | | |
| <u>(B) Incremental</u> <u>Value Per Fish</u> | | | | | |
| | Platt(1989) | \$67-\$73 | TCM | Destin/Panama City/ Grouper /(8) | R |
| | Green(1989) | \$48-\$64 | TCM | All Florida/ Red Drum/ (9) | R |
| | Andorfer& Bockstael (1986) | \$149-\$460 | TCM | Destin/Panama City/(8) | R |
| | Milon et al(1994) | \$1.68-\$2.26 | CVM | Indian River LagoonRedfish/(9) | R |
| | Milon et al(1994) | \$.14-\$.81 | CVM | Indian River Lagoon/ Seatrout/(9) | R |
| | Milon et al(1994) | \$.01-\$.03 | CVM | Indian River Lagoon/ Mullet/(9) | R |
| | Milon et al(1994) | \$.12-\$.23 | CVM | Indian River Lagoon/ Sheepshead/(9) | R |
| | Milon et al(1994) | \$.13-\$.34 | CVM | IndianRiver Lagoon/ Pompano/(9) | R |
| | Milon et al (1994) | \$.34-\$.79 | CVM | Indian River Lagoon/ King Mackerel/(9) | R |
| | Milon et al(1988) | (\$3.47) – (\$6.42) | TCM | Gulf of Mexico/ King Mackerel/(9) | R |

TABLE 1 (CONT'D)

| <u>RESOURCE CLASS</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY (DOLLARS)</u> | <u>METHOD</u> | <u>SITE/KIND</u> <u>R=RESIDENT</u> <u>V=VISITOR</u> | <u>USER</u> |
|-------------------------------------|--------------------|------------------------------|---------------|---|-------------|
| <u>COASTAL/ MARINE (Cont'd)</u> | | | | | |
| <u>MAMMALS</u> | | | | | |
| | Bendle&Bell (1995) | \$16.70 | CVM | All Florida/ Manatee/(10) | R |
| | Fishkind(1993) | \$71.00 | CVM | 4 Fl. Counties/ Manatee/(10) | R |
| <u>REPTILES</u> | | | | | |
| | Milon&Remal(1996) | \$60.26-\$108.11 | CVM | Florida/Sea Turtles/(10) | R |
| <u>WETLANDS</u> | | | | | |
| | Bell (1989) | \$51.01 | MPM | Gulf of Mexico/ Saltwater Marsh/ All Esturine-Dep Commercial Fish/ (11) | R/V |
| | Bell (1989) | \$826 (11) | MPM | Atlantic Ocean offR/Fl./Saltwater Marsh/Recreational Fishers/(12) | R/V |
| | Bell(1989) | \$ 80 (12) | MPM | Gulf of Mexicof/ Fl./Saltwater Marsh/ Recreational Fishers/ | R |

TABLE 1 (CONT'D)

| <u>RESOURCE</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY</u> | <u>METHOD</u> | <u>SITE/KIND</u> | <u>USER</u> |
|-----------------|--------------------|------------------|---------------|------------------|---------------------------------------|
| <u>CLASS</u> | | <u>(DOLLARS)</u> | | | <u>R=RESIDENT</u> <u>V=VISITOR</u> |

COASTAL/
MARINE (Cont'd)

WETLANDS (Cont'd)

| | | | | |
|--------------------|------------------|-----|---|---|
| Lynne et al (1981) | \$.91 | MPM | Gulf of Mexico/ Saltwater Marsh/ Blue Crab Com. Fish Only/(11) | R |
| Milon&Remal(1996) | \$82.23-\$115.06 | CVM | Florida/Seagrass/ (10) | R |
| Milon&Remal(1995) | \$ 3.98-\$ 62.72 | CVM | Indian River Lagoon/ Wetland Land Acquisition/(10) | R |
| Milon&Remal(1995) | \$1.42-\$51.61 | CVM | Indian River Lagoon/ Wetland Rest- Oration/(10) | R |

BEACHES

| | | | | |
|--------------------|--------|-----|-----------------------|---|
| Curtis&Shows(1984) | \$6.93 | CVM | Jacksonville Beach | R |
| Curtis&Shows(1984) | \$6.98 | CVM | Jacksonville Beach | V |
| Curtis&Shows(1982) | \$3.75 | CVM | Delray Beach | R |
| Curtis&Shows(1982) | \$3.77 | CVM | Delray Beach | V |
| Bell (1986) | \$2.60 | CVM | Pompano Beach | R |

TABLE 1 (CONT'D)

| <u>RESOURCE</u> <u>CLASS</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY</u> <u>(DOLLARS)</u> | <u>METHOD</u> | <u>SITE/KIND</u> | <u>USER</u> <u>R=RESIDENT</u> <u>V=VISITOR</u> |
|---------------------------------|----------------------|------------------------------------|---------------|--|--|
| <u>COASTAL/</u> | | | | | |
| <u>MARINE (Cont'd)</u> | | | | | |
| <u>BEACHES (Cont'd)</u> | | | | | |
| | Bell (1986) | \$1.80 | CVM | Spanish&Red Reef Parks/ Boca Raton | R |
| | Bell(1986) | \$8.51 | CVM | Spanish&Red Reef Parks/ Boca Raton | V |
| | Bell (1992) | \$2.50 | CVM | All Florida | V |
| | Bell&Leeworthy(1990) | \$54.00 | TCM | All Florida | V |
| | Bell&Leeworthy(1986) | \$2.06 | CVM | All Florida | R |
| | Bell&Leeworthy(1986) | \$2.28 | CVM | All Florida | V |
| | Bell&Leeworthy(1986) | \$16.08 | TCM | All Florida | R |
| | Bell&Leeworthy(1986) | \$46.08 | TCM | All Florida | V |
| | Leeworthy(1997) | \$67.00 | TCM | Florida Keys | R/V |
| | Leeworthy(1994) | \$70.00 | TCM | Clearwater Beach | R/V |
| | Leeworthy (1994) | \$18.61 | TCM | Honeymoon Island State Rec. Area | R/V |
| | EERG(1998) | \$22.75 | RUM | Pinellas County / | R |

TABLE 1 (CONT'D)

| <u>RESOURCE</u> <u>CLASS</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY</u> <u>(DOLLARS)</u> | <u>METHOD</u> | <u>SITE/KIND</u> | <u>USER</u> <u>R=RESIDENT</u> <u>V=VISITOR</u> |
|---------------------------------|--------------------------|------------------------------------|---------------|--|--|
| <u>COASTAL/</u> | | | | | |
| <u>MARINE(Cont'd)</u> | | | | | |
| <u>BEACHES (Cont.)</u> | | | | | |
| — | Stronge & Schultz (1997) | \$4.31 | CVM | Broward County/ Weighted Average/ All Visitors | R/V |
| | Stronge & Schultz (1997) | \$3.93 | CVM | Broward County/ County Residents | R |
| | Stronge & Schultz (1997) | \$4.27 | CVM | Broward County/ Other FL Residents | R |
| | Stronge & Schultz (1997) | \$4.52 | CVM | Broward County/ Other U.S. Visitors | V |
| | Stronge & Schultz (1997) | \$5.20 | CVM | Broward County/ International Visitors | V |
| | Stronge & Schultz (1997) | \$4.94 | CVM | Delray Beach/ | R/V |
| | Stronge & Schultz (1997) | \$4.12 | CVM | Anna Marie Island | R/V |
| | Stronge & Schultz (1997) | \$ 7.00 | CVM | Captiva Island | R/V |
| | Leeworthy (1999) | \$32.06 | TCM | Daytona Beach | R/V |
| | Leeworthy (1999) | \$34.27 | TCM | Hugh Taylor Birch State Rec. Area/ Ft. Lauderdale Beach | R/V |

TABLE 1 (CONT'D)

| <u>RESOURCE</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY</u> | <u>METHOD</u> | <u>SITE/KIND</u> | <u>USER</u> |
|-----------------|--------------------|------------------|---------------|------------------|---------------------------------------|
| <u>CLASS</u> | | <u>(DOLLARS)</u> | | | <u>R=RESIDENT</u> <u>V=VISITOR</u> |

COASTAL/
MARINE(Cont'd)

BEACHES (Cont.)

| | | | | | |
|--|------------------|---------|-----|-----------------------------------|-----|
| | Leeworthy (1999) | \$47.76 | TCM | St. Andrews State Recreation Area | R/V |
| | Leeworthy (1999) | \$42.59 | TCM | St. George Island State Park | R/V |
| | Leeworthy (1999) | \$31.19 | TCM | Gulf Islands National Seashore | R/V |

ARTIFICIAL
REEFS

| | | | | | |
|--|-------------------|-------------------|-----|---|---|
| | Bell et al (1998) | \$9.01 - \$11.32 | TCM | Northwest FL Reef Fish/ Weighted Avg. All Modes | V |
| | Bell et al (1998) | \$4.94 - \$6.54 | TCM | Northwest FL Reef Fish/ Own Boat | V |
| | Bell et al (1998) | \$11.63 - \$16.44 | TCM | Northwest FL Reef Fish/ Charter Boat | V |
| | Bell et al (1998) | \$5.96 - \$6.55 | TCM | Northwest FL Reef Fish/ Party Boat | V |
| | Bell et al (1998) | \$4.22 - \$8.63 | TCM | Northwest FL Reef Fish/ Private Rental | V |

TABLE 1 (CONT'D)

| <u>RESOURCE CLASS</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY (DOLLARS)</u> | <u>METHOD</u> | <u>SITE/KIND</u> | <u>USER</u> <u>R=RESIDENT</u> <u>V=VISITOR</u> |
|--------------------------------------|--------------------|------------------------------|---------------|--|--|
| <u>COASTAL/ MARINE(Cont'd)</u> | | | | | |
| <u>ARTIFICIAL REEFS (Cont'd)</u> | | | | | |
| | Bell et al (1998) | \$4.08 - \$8.50 | CVM | Northwest FL/ Reef Fish/ All Boat Modes | V |
| | Bell et al (1998) | \$3.35 - \$6.97 | CVM | Northwest FL/ Reef Fish/ All Boat Modes | V |
| | Bell et al (1998) | \$2.16 – \$4.92 | CVM | Northwest FL/ Reef Fish/ All Boat Modes | R |
| | Bell et al (1998) | \$1.80 - \$4.10 | CVM | Northwest FL/ Reef Fish/ All Boat Modes | R |
| | Milon (1988) | \$1.36-\$2.02 | CVM | Dade County/ Reef Fish | R |
| | Milon (1988) | \$.24- \$1.57 | CVM | Dade County/ Reef Fish | R |
| <u>NATURAL REEFS</u> | | | | | |
| | Milon&Remal(1995) | \$74.71 - \$109.62 | CVM | Florida/Coral (10) | R |
| <u>PARKS</u> | | | | | |
| | Leeworthy(1989) | \$469 | TCM | John Pennekamp Coral Reef Park/ Diving/Boating | R/V |

TABLE 1 (CONT'D)

| <u>RESOURCE</u> <u>CLASS</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY</u> <u>(DOLLARS)</u> | <u>METHOD</u> | <u>SITE/KIND</u> | <u>USER</u> <u>R=RESIDENT</u> <u>V=VISITOR</u> |
|---------------------------------|--------------------|------------------------------------|---------------|---|--|
| <u>COASTAL/</u> | | | | | |
| <u>MARINE(Cont'd)</u> | | | | | |
| <u>PARKS (Cont'd)</u> | | | | | |
| | Leeworthy(1999) | \$ 79.37 | TCM | Everglades National Park Coastal part of park | R/V |
| <u>WATER</u> | | | | | |
| <u>RESOURCES</u> | | | | | |
| | Leeworthy(1997) | \$74.64 | TCM | FL. Keys/ Snorkeling | V |
| | | \$75.39 | TCM | FL. Keys/ Scuba Diving | V |
| | | \$71.33 | TCM | FL. Keys/ Personal Water- craft Use | V |
| | | \$63.31 | TCM | FL. Keys/ Sailing | V |
| | | \$74.40 | TCM | FL. Keys/ Other Boating | V |
| | | \$59.24 | TCM | FL. Keys/ Windsurfing | V |
| | Milon&Remal | \$27.13- \$68.51 | CVM | Indian River Lagoon/Storm- Water Control To Improve Water Qual (10) | R |

TABLE 1 (CONT'D)

| <u>RESOURCE CLASS</u> | <u>AUTHOR/DATE</u> | <u>WTP/DAY (DOLLARS)</u> | <u>METHOD</u> | <u>SITE/KIND</u> | <u>USER</u> <u>R=RESIDENT</u> <u>V=VISITOR</u> |
|---------------------------|--------------------|------------------------------|---------------|--|--|
| <u>FRESHWATER</u> | | | | | |
| <u>LAKES & RIVERS</u> | | | | | |
| | Bell et al (1995) | \$4.16 | TCM | Lake Jackson/ Leon County/ Multi-Use | V |
| | Bell et al (1998) | \$3.20 | TCM | Lake Tarpon/ Pinellas County/ Multi-Use | V |
| | Stratis & Bendle | \$13.41 | TCM | Rodman Reservoir/ Putnam County/ Fishing | V/R |
| | Stratis & Bendle | \$11.12 | TCM | Rodman Reservoir/ Putnam County/ Fishing | R |
| | Stratis & Bendle | \$9.07 | TCM | Oklawaha River/ Marion County/ Multi-Use | V/R |
| | Stratis & Bendle | \$7.52 | TCM | Oklawaha River/ Marion County/ Multi-Use | R |

-
1. Charter boats only
 2. All modes of fishing
 3. Shore fishing only
 4. Offshore fishing only
 5. Tampa Bay only
 6. Tampa Bay and Pinellas County
 7. WTP per fish caught per trip. Must be multiplied by average number of fish caught per day to derive WTP/day.
 8. One additional kept fish per trip for charter boat fishing only
 9. One additional kept fish per trip
 10. WTP/Household/Year
 11. Ex Vessel Value/Acre/Year
 12. WTP/Acre/Year